

Exhibit 28

FILED UNDER SEAL

**UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK**

SECURITIES AND EXCHANGE COMMISSION,

Plaintiff,

v.

RIPPLE LABS INC., BRADLEY GARLINGHOUSE,
and CHRISTIAN A. LARSEN,

Defendants.

20-cv-10832 (AT)

Rebuttal Expert Report of Carol Osler, Ph.D.

I. Introduction

1. This report is submitted in reply to the expert report of Patrick Doody, dated October 4, 2021. I am the Martin and Ahuva Gross Professor of Financial Markets and Institutions at Brandeis University. A fuller description of my background, including my qualifications as a financial economist, is provided in my expert report dated October 4, 2021, and in my curriculum vitae, which is attached to that report.
2. I have been retained by Kellogg, Hansen, Todd, Figel & Frederick, PLLC, counsel to Defendant Ripple Labs Inc. (“Ripple”), to offer my opinions in this case as an expert witness. The terms of my engagement are described in my opening expert report. All of the opinions I offer in this report are my own. The materials I have relied on in forming my opinions are listed in Appendix A to this report.

II. Assignment and Opinions

3. I have been asked to evaluate and offer my opinions concerning the matters described in Mr. Doody’s expert report within my area of expertise. For the reasons described in greater detail below, I conclude that Mr. Doody’s report is incorrect, and inconsistent with well-established economic principles and academic research, with respect to his opinions on the manner in which XRP can be utilized for cross-border payments. Certain other observations made by Mr. Doody are flawed for similar reasons. I reserve the right to address other issues discussed by Mr. Doody in his report and to supplement this report based on any new facts or information provided to me.

A. Summary of Mr. Doody’s Report as to Cross-Border Payments

4. Mr. Doody offers the following opinion in his report:

Based on Ripple’s public statements, the design of XRP as a fixed-supply variable-price coin, and the creation of the XRP escrow accounts, I also conclude that there are certain elements in Ripple’s and its founders’ design of XRP, the XRP Ledger, and a variety of software products that appealed more to a purchaser of XRP interested in making a profit than to financial institutions seeking to embrace Ripple’s stated vision of utilizing XRP as a bridge asset for cross-border asset transfers. Financial institutions desiring a solution for international wire transfers and other cross-border payment mechanisms would be better served by a variable-supply, fixed price solution, such as offered by fiat currency. Using XRP

to complete cross-border payments requires two exchange transactions (from the source currency to XRP and from XRP to the destination currency) and involves paying the fees and trading losses (i.e. “slippage”) associated with both of those transactions. If both trades are not conducted simultaneously or if an institution needs to carry an inventory of XRP, this approach also involves tying up capital in a volatile asset with an uncertain future price that has nothing to do with the source or destination currencies intended to be transmitted abroad.¹

5. In the body of his report (at paragraphs 27-29), Mr. Doody provides the following discussion in support of that opinion:

27. The fixed-supply model used by XRP is the opposite of the fixed-price model of a fiat currency, such as U.S. Dollars, or a “stablecoin,” which is a digital asset designed to maintain a pegged value against such a fiat currency. A stablecoin issuer takes active managerial steps to ensure that the available token supply grows or shrinks to match the demand and keeps the price stable over time. There are several significant advantages to using a fiat currency or a stablecoin for cross-border currency transfers.

28. First, the variable price of XRP means that two cross-asset trades are always required to conduct a single cross-border payment: one from the source currency to XRP, and one from XRP to the destination currency. Both of these exchange transactions incur possible fees and slippage, including from price spreads between what buyers and sellers are willing to bid and offer. However, when using a traditional cross-border payment system there is a single foreign exchange transaction, for example from U.S. Dollars to Mexican Pesos. This currency exchange can be accomplished with a single trade on the interbank market for extremely low fees and slippage due to the deep liquidity in those markets. Even a stablecoin solution only requires one trade between assets that fluctuate against one another such as a U.S. Dollar stablecoin and a Euro stablecoin. And, moving between U.S. Dollars and a U.S. Dollar stablecoin can be accomplished with no fees. Ripple’s CTO David Schwartz discussed this shortcoming of using XRP for cross-border payments in a post on XRP Chat on November 11, 2016: “So the last piece [referring to ‘obstacles to using XRP for cross-border payments’] will be bringing the spreads down. To go from X [to] Y directly, you pay one spread. To go X [to] XRP [to] Y you pay two spreads.”

29. Second, anyone buying XRP to facilitate cross-border payments would have to bear the substantial price volatility of XRP. These volatility-related costs could be large compared to the margins earned in the course of fulfilling remittance or cross-border payment transactions. In fact, banking regulators have determined that the volatility of non-stablecoin digital assets like XRP warrant the maximum possible risk weighting for the purpose of calculating capital requirements. This outright gamble on the XRP price is not a desirable activity for traditional financial institutions or market makers with

¹ Doody Report ¶ 9.

conservative balance sheets (meaning that those institutions prefer to avoid holding risky assets).²

He then asserts, without citation, that “[e]xchanging directly between two fiat currencies would alleviate all of these issues.”³

6. Mr. Doody ultimately restates his conclusion on this point as follows:

The primary promoted use case, a financial institution using XRP in order to exchange one fiat currency for another and send the funds in a cross-border transaction, was flawed for two important reasons: 1) the financial institution needed to execute two separate exchange transactions on digital trading platforms that, unless subsidized by Ripple, created a strong headwind to economic viability by incurring two rounds of fees and slippage and 2) parties involved, whether financial institutions or other market participants, had unwanted exposure to the price and volatility of that bridge asset.⁴

B. Summary of Opinions

7. Mr. Doody’s reasoning and conclusions are fundamentally flawed. They are inconsistent with basic economic principles and they display a lack of understanding of the current operations of the foreign exchange markets. Among other things, Mr. Doody: (1) rests his analysis on an erroneous and non-existent distinction between fiat currencies and XRP in terms of whether their supplies and prices are “fixed” or “variable”; (2) concludes from that non-existent distinction that fiat currencies would be superior to XRP as a “vehicle currency” (as we refer to them in economics) or a “bridge currency” (as is used colloquially); (3) misunderstands the current processes available for executing cross-border payments, including by assuming that all traditional cross-border payments involve only “a single foreign exchange transaction”; and (4) ignores the way that Ripple’s ODL product actually functions by, among other things, assuming that users of the ODL product risk significant “unwanted exposure” to the price volatility of XRP. In addition, Mr. Doody repeatedly misunderstands or misconstrues the (relatively few) economic authorities on which he purports to base his opinion.

² Doody Report ¶¶ 27-29 (footnotes omitted).

³ Doody Report ¶ 31.

⁴ Doody Report ¶ 90.

III. Analysis

A. Mr. Doody's Opinion Is Based on Non-Existent Distinctions Between Fiat Currencies and XRP

8. Mr. Doody bases his opinion, in part, on a purported distinction between fiat currencies and XRP that, in his view, makes fiat currencies clearly superior as vehicle currencies for cross-border payments. Mr. Doody asserts that fiat currencies are in “variable” supply but have “fixed” prices, while XRP has “fixed” supply and a “variable price.”⁵ He initially asserts this contrast in paragraph 9 of his report, and then elaborates on it in Section 5.1. But as a matter of well-established economic principles, no such distinction exists. Mr. Doody's suggestion to the contrary reflects his lack of familiarity with two critical processes: the process by which fiat currencies are created and the process through which exchange rates among fiat currencies are determined. Because his opinions rest on fundamental misunderstandings, the conclusions and opinions set forth in his report are unreliable and have no validity.

9. First, Mr. Doody mischaracterizes the supply of XRP most relevant to the day-to-day determination of XRP prices. He asserts that XRP has a “fixed supply” that affects its trading price, supposedly because of the 100 billion units of XRP that were created initially, a number that cannot be increased.⁶ However, that 100-billion figure can only be viewed as the “very-long-run” supply of XRP and its influence on XRP exchange rates day-to-day is likely to be minimal. To clarify this, I draw on the nature of XRP as a currency, as described at length in my original report. This makes its price in dollar terms an exchange rate, and I take lessons from the economic and academic literature about how exchange rates among fiat currencies are determined.

10. In the long run – at time horizons of ten to twenty years – flexible fiat-currency exchange rates are influenced by (a) a country's current money supply and (b) the expected growth rate of that supply. The XRP “supply” quantity analogous to a fiat currency's “current money supply” is

⁵ Doody Report ¶¶ 24, 27.

⁶ To be clear, I do not disagree with Mr. Doody's statement that the total supply of XRP is capped at 100 billion units. I disagree with Mr. Doody's suggestion that this limitation on the total number of units of XRP can have any economically significant influence on the day-to-day trading prices of XRP, or that it provides any basis to distinguish between XRP and fiat currencies.

the amount available for trading. For XRP this is far less than 100 billion units in existence because many billions of XRP are (a) sequestered in escrow accounts and cannot be traded, or potentially (b) held by individuals or entities with no interest in selling their XRP holdings. The likely growth rate of the supply of XRP available for trading is influenced by the amount of XRP held and released from escrow accounts, market supply and demand, and – in the very dim future – the 100 billion upper limit.

11. Though money supplies influence exchange rates in the very long run, a myriad of empirical studies find that a country’s money supply has little to no detectable impact on its exchange rates day-to-day, or week-to-week, or month-to-month.⁷ The hypothesis that money supplies influence fiat-currency exchange rates is at the core of the “monetary model of exchange rates”; there has long been a strong consensus among economists that this model is incorrect. To quote one of the myriad statements about this consensus: “[e]mpirical studies investigating the monetary model of exchange rate determination ... over the modern floating exchange rate period find virtually no support for this long-standing theoretical model.”⁸ At the time horizons of relevance for most practical purposes, money supplies have little-to-no influence on spot exchange rates among fiat currencies. This evidence suggests that the supply of XRP – however it is measured – is also likely to have equally limited influence on XRP exchange rates.

12. Second, Mr. Doody’s report is incorrect in suggesting that fiat currencies have “variable” supplies, and contrasting those “variable” supplies with the “fixed” supply of XRP. Mr. Doody’s report does not define the term variable, and his use of the term is not supported by well-accepted language in economics research. From context, it appears that Mr. Doody intends his claim that fiat currencies are in “variable supply” to mean this: the supply of the currency fluctuates based on economic conditions. Contrary to this claim, the supply of fiat currencies is

⁷ The following paper is one of many – probably hundreds – that document the absence of influence from money supplies to exchange rates at the one-month time horizon: Du, Jiangze, Runfang Yu, Jin Li, and Kin Keung Lai (2019). Do the Markov switching-based hybrid models perform better in forecasting exchange rates? *Emerging Markets Finance & Trade* 55: 1497-1515. For early evidence of the failure of monetary models at practical time horizons see Meese, Richard, and Kenneth Rogoff (1983). Empirical exchange rate models of the seventies: Do they fit out of sample? *Journal of International Economics* 14: 3-24.

⁸ Rapach, David E., and Mark E. Wohar (2004). Testing the monetary model of exchange rate determination: A closer look at panels. *Journal of International Money and Finance* 23: 867-895.

not determined by economic conditions. At any point in time, the supply of a fiat currency is, as a matter of fundamental economic principles, under the (indirect) control of its central bank. The goal of most central banks today is to have the local money supply grow at a slow, steady pace. This is illustrated by money-supply growth in the U.S., represented in Figure 1. The US Federal Reserve has succeeded in maintaining a slow, steady pace of money growth over the past four decades. This also demonstrates that the supply of a well-managed fiat currency does not generally grow or shrink in response to changing economic conditions.

Figure 1: U.S. Money Supply (M2), 1981 to 2020.⁹



13. The central bank’s mechanism of control over the money supply is described at length in any typical *Money and Banking* textbook.¹⁰ In most countries, most of the time, the supply of a given fiat money (which I will label M) is the product of the country’s “monetary base” (MB), and the country’s “money multiplier” (mm). Hence, $M = MB * mm$. The central bank typically controls the monetary base, MB , rather than the total money supply, M . The public and the banks control the money multiplier, and most of the time mm is fairly stable; around crises, however, mm can swing quite a bit. In normal times, the central bank seeks to achieve a slow, steady growth in M by increasing MB at a slow, steady pace. In crises, the central bank offsets changes in mm with opposite-direction changes in MB . If mm falls, for example, the central bank ensures that M stays on the intended growth path by raising MB . In other words, contrary to Mr. Doody’s characterization of fiat currencies as having “variable” supplies, the supply of a fiat currency is largely under the control of its central bank and the supply does not fluctuate rapidly in response

⁹ Source: Federal Reserve Bank of St. Louis Economic Data. Shaded areas indicate recessions.

¹⁰ For example, the money-supply mechanism is discussed at length in Mishkin, Frederic (2014). *The Economics of Money, Banking, and Financial Markets*, 11th edition (Pearson).

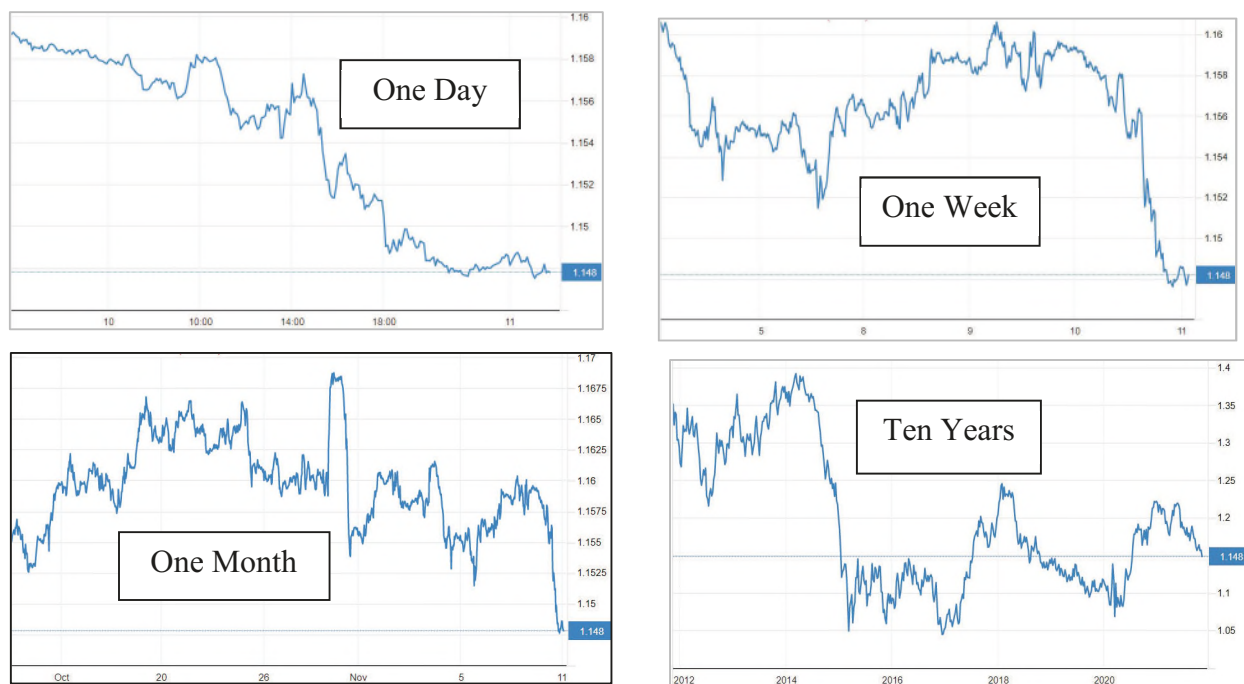
to market conditions. To the contrary, the central bank uses its indirect control of the country's money supply to ensure it grows slowly and steadily over time.

14. Third, Mr. Doody is incorrect in describing fiat currencies as having “fixed prices” and contrasting those “fixed” prices. Mr. Doody does not define the term “fixed,” but I infer from context that he intends it to mean “independent of economic conditions.” Contrary to Mr. Doody's claim, the vast majority of fiat currency prices vary according to economic conditions.¹¹ To clarify, it is appropriate to focus once again on exchange rates among fiat currencies, which are directly analogous to the “price” of XRP in terms of U.S. dollars. Most fiat-currency exchange rates change all the time; one can even watch them change in real time online.¹² As illustrated in Figure 2 below, these values often swing wildly over a given day, week, or month. Indeed, Mr. Doody's own report acknowledges that the prices of fiat currencies are not fixed against one another either: he concedes that the prices of currencies like the U.S. dollar and the Euro – or of stablecoins representing those currencies – “fluctuate against one another.”¹³ Clearly, fiat currencies do not have “fixed prices.” Instead, fiat currencies and XRP are the same insofar as they have variable prices.

¹¹ The only exceptions are currencies with specific fixed exchange rates, such as Hong Kong dollars to U.S. dollars or Saudi Arabian Riyals to the U.S. dollar. Note that these currencies' exchange rates are only fixed against the U.S. dollar: against all other currencies they float along with the U.S. dollar.

¹² One site where one can observe exchange rates change in real time: <https://www1.oanda.com/currency/live-exchange-rates/>.

¹³ Doody Report ¶ 28.

Figure 2: Volatility is apparent in the euro-dollar exchange rate at any time horizon¹⁴

15. In short, contrary to Mr. Doody’s unsupported assertions, the vast majority of fiat currencies do not have variable supplies and fixed prices. Instead, they can be reasonably characterized as having fixed (controlled) supplies and variable prices, the same characterization Mr. Doody provides for XRP. Because Mr. Doody’s contrast between XRP and fiat currencies has no basis, the conclusions he draws from that contrast are invalid.

16. There is no validity, for example, to Mr. Doody’s inference that “[f]inancial institutions desiring a solution for international wire transfers and other cross-border payment mechanisms would be better served by a variable-supply, fixed price solution, such as offered by fiat currency [than by XRP].” Fiat currencies have what Mr. Doody calls fixed supply and variable price, like XRP. Mr. Doody’s claim that fiat currencies are more attractive for having variable supply and fixed price is therefore baseless and misleading.

17. The absence of contrast between fiat currencies and XRP in this regard also invalidates Mr. Doody’s implicit assertion that Ripple chose to fix the supply of XRP day-to-day, and to grow it at a slow pace, to lead investors to expect its price to rise.¹⁵ From an economic

¹⁴ Source: Tradingeconomics.com, accessed November 10, 2021.

¹⁵ Doody Report ¶¶ 23-24, 43.

perspective, this assertion can only be described as mystifying; I am not aware of any support for it in the literature, and Mr. Doody cites none. *Ceteris paribus*, a rise in the supply of something can be expected to *lower* its value, not to *raise* its value.

18. Mr. Doody's incorrect assertion that there is a meaningful distinction between fiat currencies and XRP with respect to whether their supplies and prices are fixed or variable extends to his discussion of stablecoins in paragraph 27 of his report. A stablecoin has a fixed value in terms of one fiat currency. The example he cites, Circle's U.S. Dollar Coin (USDC), has a fixed value in terms of U.S. dollars (USD). To achieve this, Circle's supply of USDC varies according to economic conditions. Mr. Doody fails to note, however, that the value of a stablecoin like USDC is only fixed against the USD; it is not fixed against the euro, the yen, the British pound, the Australian or New Zealand dollars, or indeed any of the hundred-plus tradeable currencies in the world with flexible exchange rates against USD. Whenever the value of USD changes against those currencies, USDC's value against those currencies changes in parallel. Because the value of USDC is fixed in terms of U.S. dollars, its value against most other fiat and crypto currencies likewise changes constantly.

19. Contrary to the assertion in paragraph 27 of Mr. Doody's report, economic analysis indicates that a stablecoin would be neither better nor worse than XRP as a vehicle (bridge) currency because the value of a stablecoin is only stable with respect to one currency. The issues Mr. Doody identifies with XRP in paragraphs 28 and 29 of his report would therefore arise equally with a stablecoin.

B. Mr. Doody's Opinion Is Based on a Misunderstanding of the Current Available Options for Cross-Border Payments

20. Mr. Doody's explanation for his opinion that XRP is unsuitable as a vehicle currency, described above, reflects a serious misunderstanding of how cross-border payments currently take place. This fundamental misunderstanding further renders invalid and unreliable his opinion that it is "flawed" to use XRP "to exchange one fiat currency for another and send the funds in a

cross-border transaction.”¹⁶ I refer to my original report in this matter for a more detailed discussion of how cross-border payments typically work.¹⁷

21. First, and most significantly, Mr. Doody mistakenly asserts that “when using a traditional cross-border payment system there is a single foreign exchange transaction.” This assertion is flatly incorrect. The vast majority of fiat-currency transactions that do not start or end in U.S. dollars require two steps, not one. The first step is to sell the source currency for USD; the second step is to sell the USD for the destination currency. To take one example, someone who wants to exchange Australian dollars (AUD) into Mexican pesos (MXN) would need to go through two steps to complete the transaction: AUD to USD, and then USD to MXN. The two-step process arises for non-USD pairs because few liquid, ready-to-trade currency pairs do not involve USD. The only such pairs involve the euro against other European currencies, such as the Danish krone (EUR/DKK), or the euro against the Japanese yen (EUR/JPY). For all other non-USD currency pairs, USD serves as the vehicle currency. As an economic matter, this two-step process is no different from the two-step process Mr. Doody criticizes; that same person could convert AUD to XRP and then XRP to MXN in the same number of steps as the traditional currency trading process.

22. To appreciate the importance of this two-step process, consider some of the most active remittance corridors today: Persian Gulf states to India, Bangladesh, Egypt, the Philippines, and Pakistan;¹⁸ rich states along the Pacific Rim of Asia, such as Hong Kong, Japan, and Singapore, to poorer states such as China, South Korea, the Philippines, Thailand, and Vietnam.¹⁹ For each of those significant remittance corridors, which do not start or end in USD, cross-border payments are conducted in two steps, using USD as the vehicle currency.

¹⁶ Doody Report ¶ 90.

¹⁷ Opening Report ¶¶ 57-61.

¹⁸ See <https://countryeconomy.com/demography/migration/remittance/saudi-arabia>; <https://countryeconomy.com/demography/migration/remittance/kuwait>; <https://countryeconomy.com/demography/migration/remittance/oman>.

¹⁹ See <https://www.finder.com/hk/remittance-statistics>; <https://www.statista.com/statistics/934582/outgoing-remittance-from-japan-by-country-of-destination/>; <https://www.statista.com/statistics/941322/outgoing-remittance-from-singapore-by-country-of-destination/>.

23. Accordingly, Mr. Doody’s criticism that cross-border payments using XRP would “create a strong headwind to economic viability by incurring two rounds of fees and slippage” is wrong. For most transactions that do not originate or end in U.S. dollars, two rounds of fees and slippage would occur in traditional cross-border payments as well, so this is not a “headwind to economic viability,” as Mr. Doody claims.²⁰ Indeed, as I noted in my opening report, Ripple has focused much of its effort in markets outside of the United States and specifically in the Pacific Rim of Asia, where senders in cross-border foreign exchange transactions would be most likely to face this two-step process.²¹

24. Mr. Doody also makes no mention of the significant expense currently involved in current cross-border transactions, which I described in my opening report – in particular, high fees and slow transaction times.²² The following two paragraphs discuss these issues in turn.

25. With respect to fees, Mr. Doody acknowledges that foreign currency transactions are subject to “bid-ask spread[s],”²³ but he ignores the substantial *additional* fees that intermediaries typically charge in traditional cross-border payment transactions. Indeed, he appears to confuse bid-ask spreads and fees: when discussing a hypothetical USD/MXN transaction, Mr. Doody states that “[t]his currency exchange can be accomplished with a single trade on the interbank market for extremely low fees and slippage.”²⁴ As support, however, he cites an article that discusses a measure of *bid-ask spreads*, not *fees*, for USD/MXN transactions.²⁵ As I noted in my

²⁰ Mr. Doody suggests that using a stablecoin would also “only require[] one trade between assets that fluctuate against one another” because USDC can be purchased in U.S. Dollars without fees. *See* Doody Report ¶ 28. But the source that Mr. Doody relies on indicates that this fee-free purchase is available only to *consumer* purchasers, not institutional purchasers. *See* Circle USDC Fee Schedule. <https://support.usdc.circle.com/hc/en-us/articles/360015471331> (stating, “[t]he following fee structure applies to current existing Circle USDC Consumer accounts,” and “[f]or all Circle Business and API pricing and fees, please reach out to sales@circle.com for more information”). And Mr. Doody does not suggest that there are liquid trading pairs involving USDC and most other fiat currencies. To illustrate this point: one of the “popular digital asset trading platforms” that Mr. Doody identifies in his report, Coinbase, expressly states that “residents in Mexico *cannot* sell or ‘cash out’ their USDC.” <https://help.coinbase.com/en/coinbase/getting-started/crypto-education/usd-coin-usdc-faq>. So contrary to Mr. Doody’s suggestion, a Mexican resident converting U.S. dollars to Mexican pesos would still need to conduct two trades of fluctuating assets in order to “cash out” the money and would not be able to use USDC as the vehicle currency.

²¹ Opening Report ¶ 71.

²² Opening Report ¶¶ 25-26.

²³ Doody Report n.26.

²⁴ Doody Report ¶ 28.

²⁵ Doody Report n.26.

opening report, fees for international money transfers can be significant, and “interbank” transfers – the kind Mr. Doody considers here – are the most expensive, with average costs in excess of 10% for remittances. Because Mr. Doody considers only the bid-ask spread and not the fee component of costs for traditional cross-border payments, he ignores a significant source of costs, and the conclusions he draws in terms of comparative cost are necessarily flawed. Furthermore, Mr. Doody misinterprets the data in the article he cites.²⁶ The bid-ask spreads presented in that article are “realized spreads” modeled using a counterfactual regression analysis – something quite distinct from the bid-ask spreads a trader would have been quoted by a dealer. The bid-ask spreads Mr. Doody cites are not valid for estimating the bid-ask-spread component of the cost of international payments.

26. With respect to transaction times, Mr. Doody does not mention these at all. As I observed in my opening report, foreign currency trades using traditional payment rails typically take at least two business days to settle in wholesale markets, and up to 10 business days in the remittance context.²⁷ By contrast, trades using XRP as a vehicle currency generally settle in just a few seconds.²⁸ This is a critical advantage of using XRP as a vehicle currency, and Mr. Doody’s failure to consider it renders his opinions unreliable.

C. Mr. Doody Falsely Claims that ODL Users Must Hold XRP Long-Term and Misunderstands the Nature of Volatility

27. Mr. Doody argues that “anyone buying XRP to facilitate cross-border payments would have to bear the substantial price volatility of XRP.”²⁹ This argument misunderstands the nature of volatility and how the ODL product actually functions.

²⁶ The paper Mr. Doody cites in this context is: Chen, Shikuan, Chih-Chung Chien, and Ming-Jen Chang (2012). Order flow, bid-ask spread, and trading density in foreign exchange markets. *Journal of Banking and Finance* 62: 597-612. As noted above, the bid-ask spread estimates from this paper that Mr. Doody quotes are not the bid-ask spreads that a dealer would quote to traders. Rather, they correspond to a different bid-ask spread concept known as the “realized spread,” which includes exchange-rate movements after the trade. There are additional reasons why these spread estimates are unsuitable for discussing the costs of international payments. First, the estimates are not taken straight from the data but instead require calculations using estimated regression coefficients. Second, the regression estimates are associated with a model that assumes, counterfactually, that bid-ask spreads are constant.

²⁷ Opening Report ¶¶ 25, 62. The one exception to this would be trades in USD/CAD, which can settle in one business day.

²⁸ Opening Report ¶ 54.

²⁹ Doody Report ¶ 29.

28. First, as previously noted, transactions in XRP generally settle within seconds while fiat currencies settle in days.³⁰ Nonetheless, Mr. Doody presents, as the relevant XRP volatility, a “1-month volatility” measure that has been annualized: 65.1%.^{31, 32} However, this measure is entirely and clearly irrelevant. It does not matter how much XRP’s price is likely to change over the course of a month, and annualizing that number is meaningless. What does matter is how much the price of XRP is likely to change over the course of five-or-so seconds, the period during which a transaction is pending.³³ Mr. Doody’s report makes no attempt to identify that measure, though Mr. Doody’s source does include XRP volatility at the one-minute horizon. That figure is approximately 0.1%.³⁴ This allows us to estimate volatility at the five-second time horizon as approximately 0.0083%.³⁵

29. Second, Mr. Doody wrongly asserts that institutions engaged in cross-border payments will “need[] to carry an inventory of XRP.”³⁶ According to the definition of a vehicle (or bridge) currency, the currency is only used during the process of individual transactions. As described above, to convert Australian dollars (AUD) to Mexican pesos (MXN) one first sells AUD for the vehicle currency, and then sells the vehicle currency for MXN. When using XRP, the transaction process can be measured in seconds and the vehicle currency is only possessed during those few seconds. By implication, payments processing institutions that rely on ODL will only hold XRP for very short time periods and, contrary to Mr. Doody’s assertion, such institutions need not incur significant “unwanted” exposure to XRP volatility. The risk associated with longer-term XRP positions would be borne instead by others, including Ripple itself, which would “facilitate these instant payments, by [] sourc[ing] XRP from its balance sheet.”³⁷ That risk would also be

³⁰ Opening Report ¶¶ 25, 54, 62.

³¹ Doody Report n.29.

³² Doody Report n.29.

³³ <https://ripple.com/rippletnet/on-demand-liquidity/>.

³⁴ Gradojevic, Nikola, and Ilias Tsiakas (2012). Volatility cascades in cryptocurrency trading. *Journal of Empirical Finance* 62: 252-265. The figure 0.1% is based on the paper’s annualized figure of 79.1% for one-minute volatility. To eliminate the annualization I assume 24-hour trading every day of the year because cryptocurrencies are traded 24/7. The figure does not meaningfully change if one assumes a 256-day year.

³⁵ The five-second estimate exploits the fact that financial-market volatility rises roughly linearly with time horizon.

³⁶ Doody Report ¶ 9.

³⁷ <https://ripple.com/insights/record-growth-and-traction-odl-in-2021/>. To be clear, as this source indicates, Ripple allows ODL users to obtain the necessary XRP directly from Ripple on an “instant” basis, so there is no requirement

borne by other market participants who choose to hold XRP on a sustained basis, if Ripple chooses to source XRP from the market in support of the ODL product.

30. Mr. Doody is also incorrect when he suggests that banks involved in payments processing would be required by regulators to hold substantial additional capital to support their trading operations. To begin, I note that this criticism would apply only to regulated banks, even though many other types of institutions or individuals might use ODL. In any event, this criticism is invalid even with respect to regulated banks. It is certainly true that banks are required to hold capital against trading assets, and this requirement would apply with respect to banks that maintain significant holdings of XRP for that purpose over substantial periods of time.³⁸ However, for the operational reasons explained above, banks do not need to maintain significant holdings of XRP as trading assets. Mr. Doody's concern that reliance on XRP as a vehicle currency would increase a bank's regulatory capital is thus entirely speculative and unsupported.

31. Finally, as I explained in my opening report, exchange rates among fiat currencies are highly volatile.³⁹ To illustrate, the average one-minute change in EUR/USD prices (the world's most heavily traded currency pair) is around 0.02%. Mr. Doody suggests that a fiat currency would offer a better "solution" for international money transfers,⁴⁰ but he never addresses the fact that fiat currencies are also highly volatile, nor the fact that traditional currency exchange transactions take much longer to settle (meaning the vehicle currency must be held for a longer time, with a corresponding increase in exposure to volatility). This further renders his analysis faulty.

D. Mr. Doody Misinterprets Ripple's Business Strategy

32. As outlined in my opening report, Ripple's stated goal is to establish itself as a competitor to existing payments providers.⁴¹ That goal is especially challenging because Ripple asserts that it is creating a disruptive product that involves "network externalities": a network is required for the product to function well, but without the network no-one has an incentive to join.

for ODL users to hold XRP on a sustained basis or to purchase it from market makers before beginning an ODL transaction.

³⁸ Doody Report n.30.

³⁹ Opening Report ¶¶ 14-15.

⁴⁰ Doody Report ¶ 9.

⁴¹ Opening Report ¶¶ 19-21, 43-44, 65-74.

Further, as the network grows it becomes economical for more participants to join the network, which in turn makes it economical for another round of participants to join, and so on. As stated in paragraph 69 of my opening report, “[g]aining market share with a disruptive product that must ultimately create a network to thrive is extremely challenging. The reason is that the network of a dominant firm creates an almost insurmountable ‘barrier to entry’ for challengers.”⁴² I refer to my opening report for a detailed description of the close correspondence between Ripple’s strategic approach and the optimal strategy recommended by economists for managing this particular set of challenges.

33. Mr. Doody devotes many paragraphs to interpreting Ripple’s strategic behavior. However, throughout that discussion, he never analyzes Ripple’s strategy in light of these economic challenges. Likewise, Mr. Doody does not address the close match between the Ripple strategies he discusses and the ways in which those strategies advance Ripple’s business objectives. For example, Mr. Doody ignores Ripple’s need to create a network when he discusses topics such as Ripple’s efforts to create partnerships with financial institutions.⁴³ He likewise ignores the commercially strategic importance of establishing a network in discussing Ripple’s support payments to Moneygram.⁴⁴ Mr. Doody assumes, without analysis, that Ripple’s statements on those topics were designed to appeal to “investment-oriented purchasers” and were made to increase the price of XRP. In doing so, Mr. Doody fails to consider the more logical explanation that Ripple’s statements advanced the goal of building Ripple’s own network, as opposed to generating interest among Mr. Doody’s so-called “investment-oriented purchasers” of XRP. Mr. Doody’s failure to consider the economic, commercial, and operational factors associated with Ripple’s strategy makes his conclusions unreliable.

34. Mr. Doody also ignores Ripple’s need to create a network when he discusses Ripple’s trading in XRP. In his report, he observes that Ripple conducted programmatic and over-the-counter sales of XRP⁴⁵ and what Mr. Doody calls “buybacks” of XRP.⁴⁶ In evaluating these

⁴² Opening Report ¶ 69.

⁴³ Doody Report ¶ 38.

⁴⁴ Doody Report ¶ 39.

⁴⁵ Doody Report ¶¶ 32-37.

⁴⁶ Doody Report ¶¶ 44-47. Mr. Doody quotes two reports by Ripple stating that Ripple purchased XRP in the secondary market and then characterizes those purchases as “buybacks.” But he offers no evidence that the XRP that

trades, Mr. Doody's report becomes internally inconsistent. He argues that Ripple attempted to minimize market impact of its sales and he quotes Ripple's view that "[a] healthy, orderly XRP market is required to minimize cost and risk for customers." Mr. Doody opines in this context that "buyback activity [intended to stabilize the price] would not have mattered to purely utility-oriented purchasers of XRP."⁴⁷ This directly contradicts Mr. Doody's opinion elsewhere in his report that volatility in XRP prices was a matter of concern for the utility-oriented customers of Ripple's ODL product.⁴⁸ Mr. Doody offers no explanation for this internal contradiction, which further shows how Mr. Doody's opinions lack a sound foundation in economics or logic.

Ripple purchased on the secondary market was ever owned by Ripple previously. In other words, he elides the distinction between "buying" and "buying back."

⁴⁷ Doody Report ¶ 47.

⁴⁸ Doody Report ¶¶ 29, 90.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on November 12, 2021


Carol Osler

Appendix A: Materials Considered

Litigation Materials and Related Sources:

Expert Report of Carol Osler (“Opening Report”), *Securities and Exchange Commission v. Ripple Labs Inc.*, October 4, 2021, and sources cited therein.

Expert Report of Patrick Doody (“Doody Report”), *Securities and Exchange Commission v. Ripple Labs Inc.*, October 4, 2021.

Books and Articles:

Chen, Shikuan, Chih-Chung Chien, and Ming-Jen Chang (2012). Order flow, bid-ask spread, and trading density in foreign exchange markets. *Journal of Banking and Finance* 62 (cited in Doody Report).

Du, Jiangze, Runfang Yu, Jin Li, and Kin Keung Lai (2019). Do the Markov switching-based hybrid models perform better in forecasting exchange rates? *Emerging Markets Finance & Trade* 55.

Gradojevic, Nikola, and Ilias Tsiakas (2012). Volatility cascades in cryptocurrency trading. *Journal of Empirical Finance* 62 (cited in Doody Report).

Meese, Richard, and Kenneth Rogoff (1983). Empirical exchange rate models of the seventies: Do they fit out of sample? *Journal of International Economics* 14.

Mishkin, Frederic (2014). *The Economics of Money, Banking, and Financial Markets*, 11th edition (Pearson).

Rapach, David E., and Mark E. Wohar (2004). Testing the monetary model of exchange rate determination: A closer look at panels. *Journal of International Money and Finance* 23.

Data Sources and Websites:

Data for Figure 1: Federal Reserve Bank of St. Louis Economic Data.

Data for Figure 2: Tradingeconomics.com.

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<https://www.statista.com/statistics/941322/outgoing-remittance-from-singapore-by-country-of-destination/>.